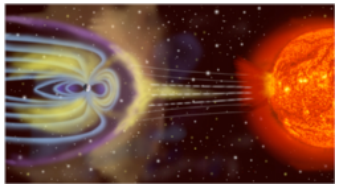
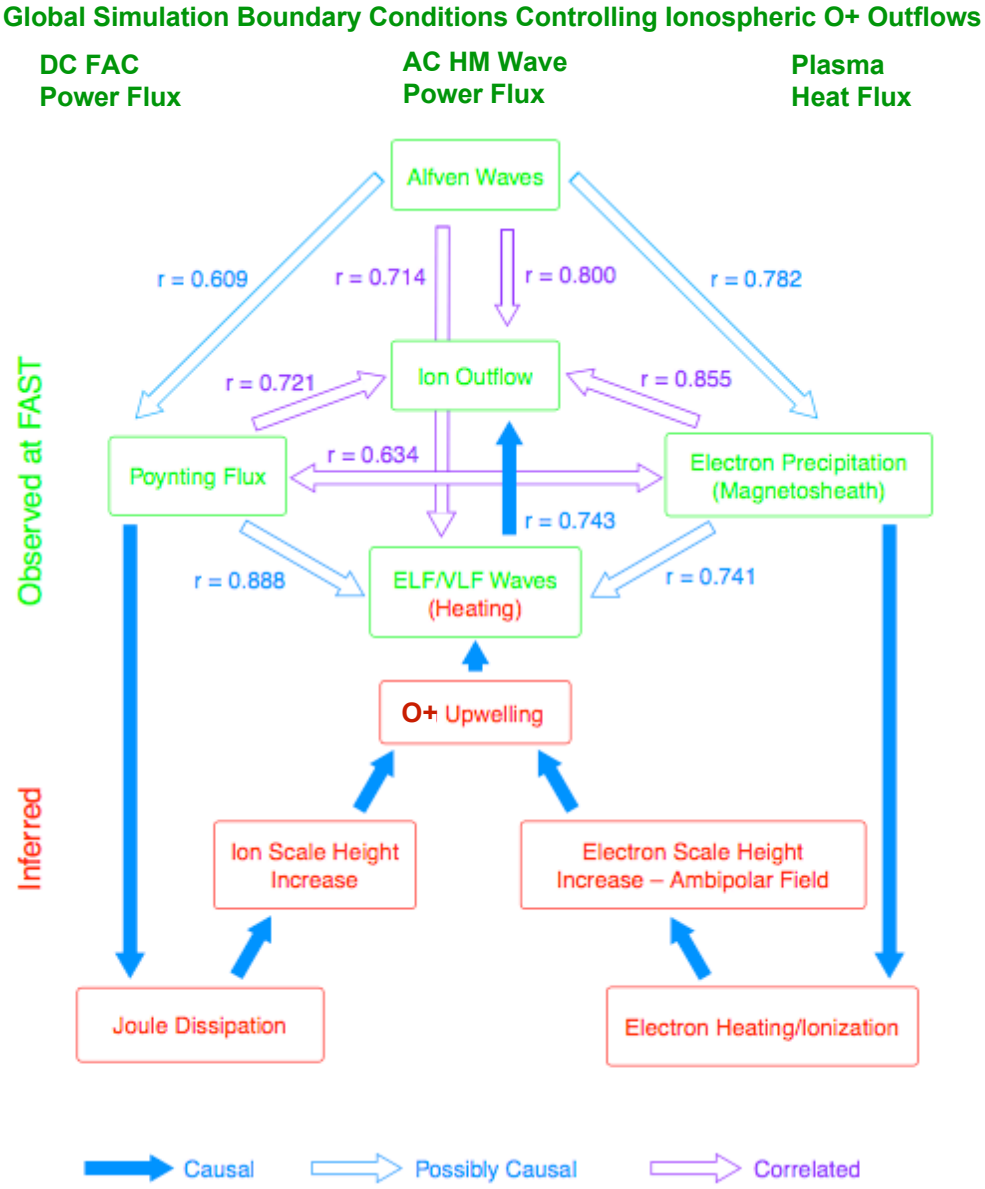
Outflow response to energy inflow

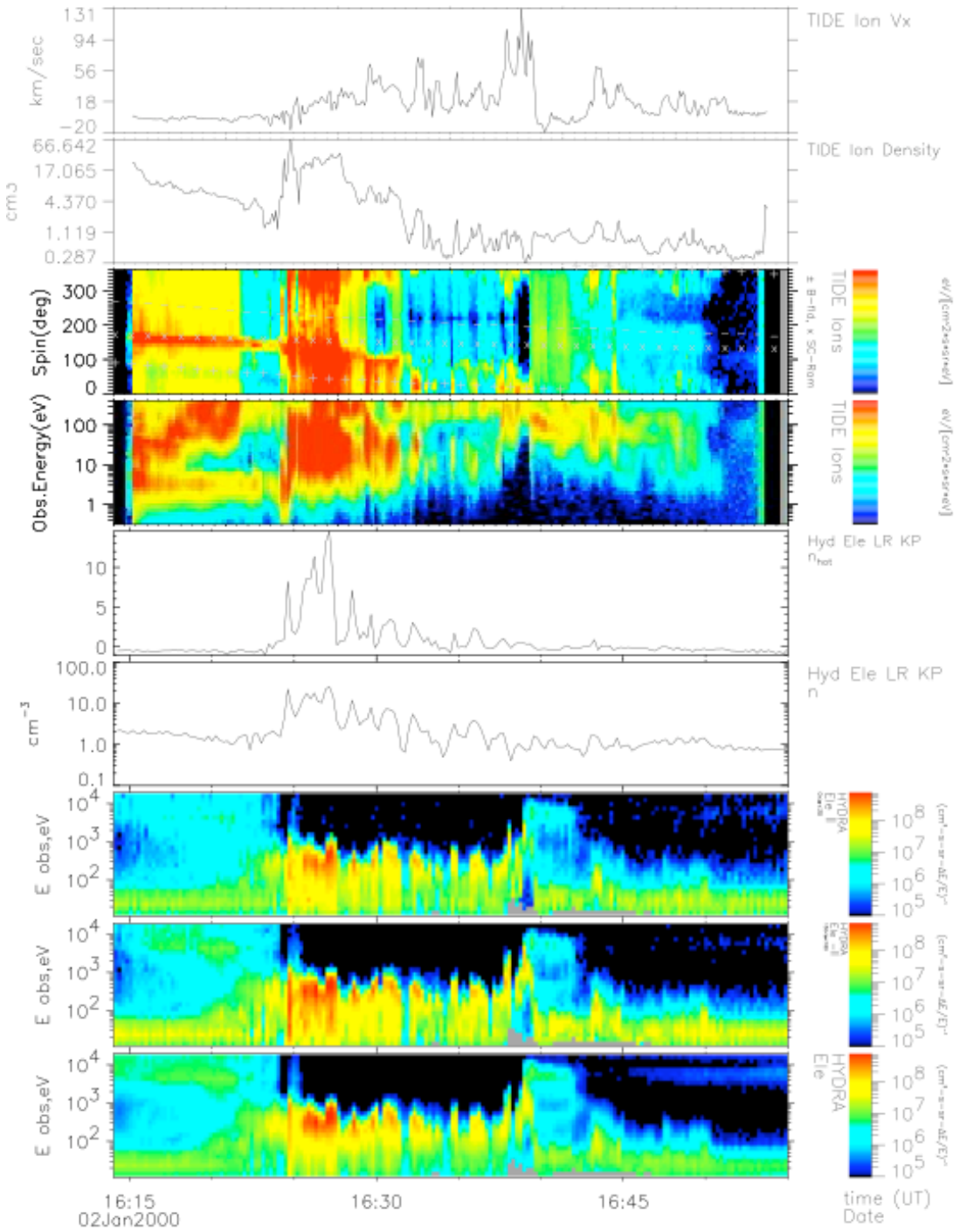




- R J Strangeway
- Observe external energy inputs
- Responsive O+ plasma outputs
- H+ outflow velocity responsive but
- H+ plasma outflow flux unresponsive
- Empirical basis glosses over the heating details
- Full theory w/aurora developing in ITM

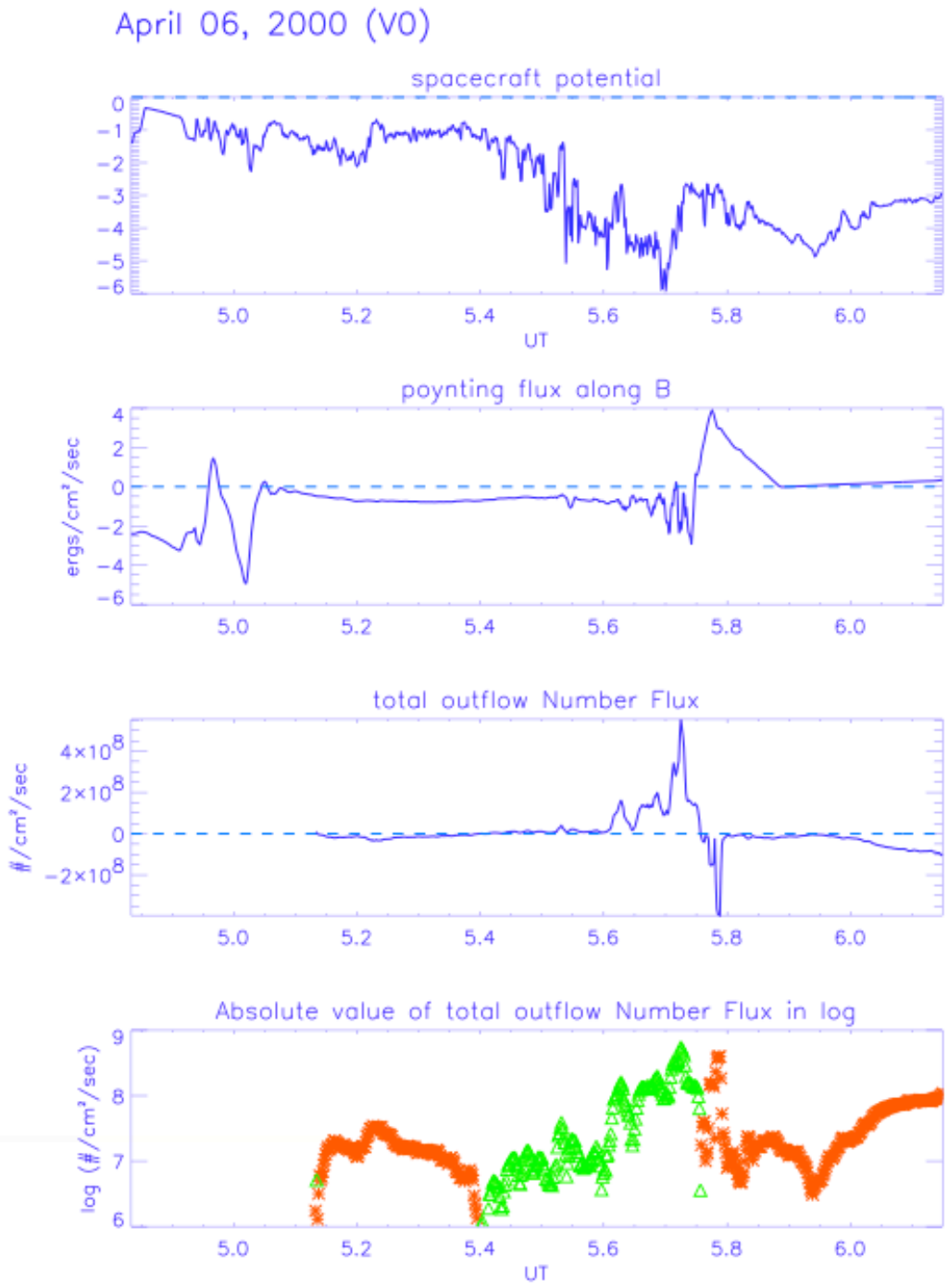
Polar study of outflow response

- Example event from Polar of data set supporting study to complement FAST
- Key data
  - Plasma flow, density
  - Electron flux, E spect
  - Transverse E, dB
- 19 events analyzed to date
- Many more coming soon

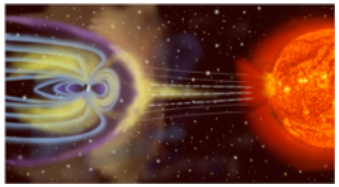


Polar study of outflow response

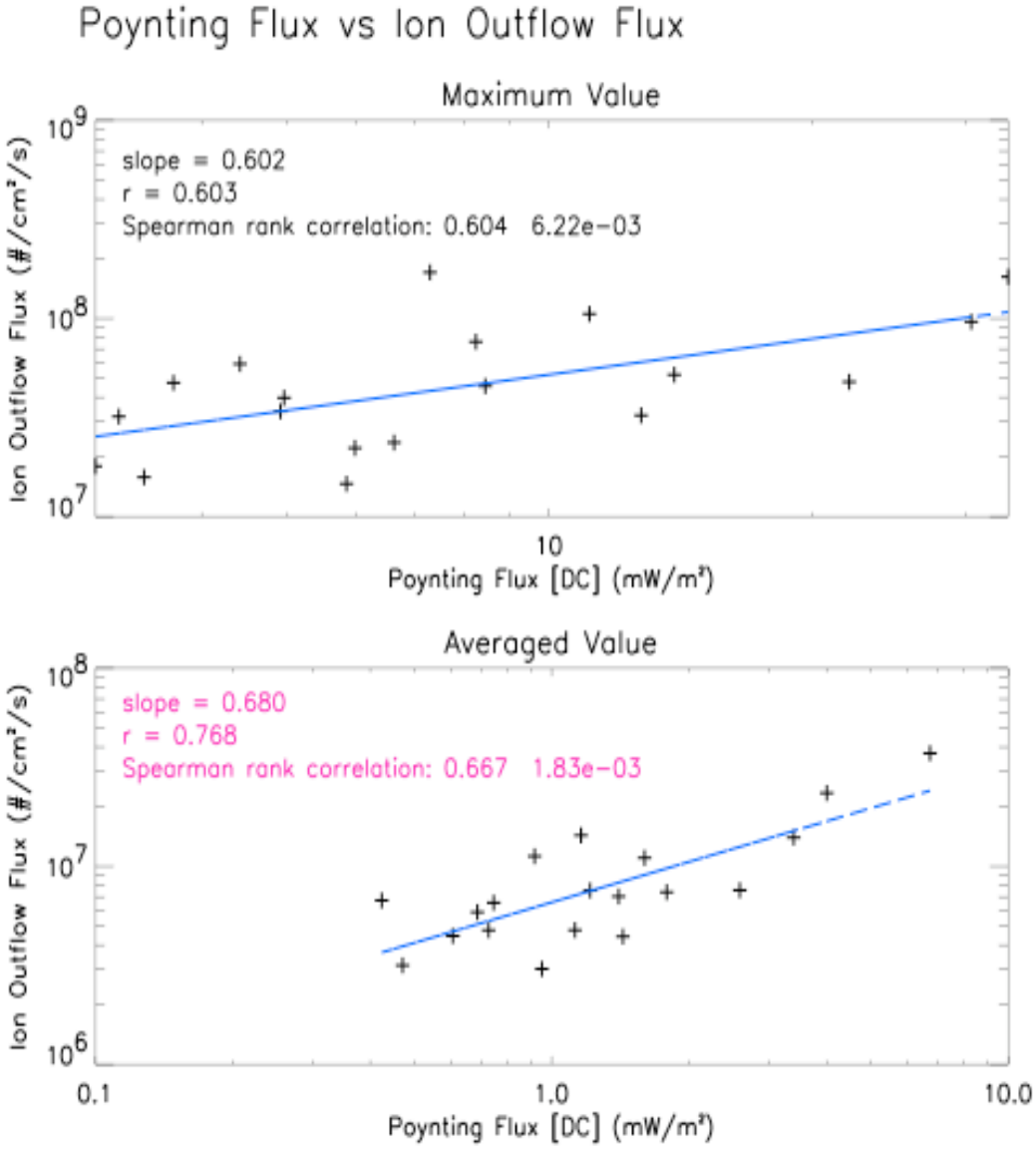
- Spacecraft potential signif for ionospheric flow
- Poynting flux here is DC only.
- Outflow flux is substantial, and clearly has a Poynting contribution



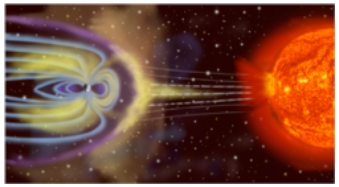
Polar study of outflow response



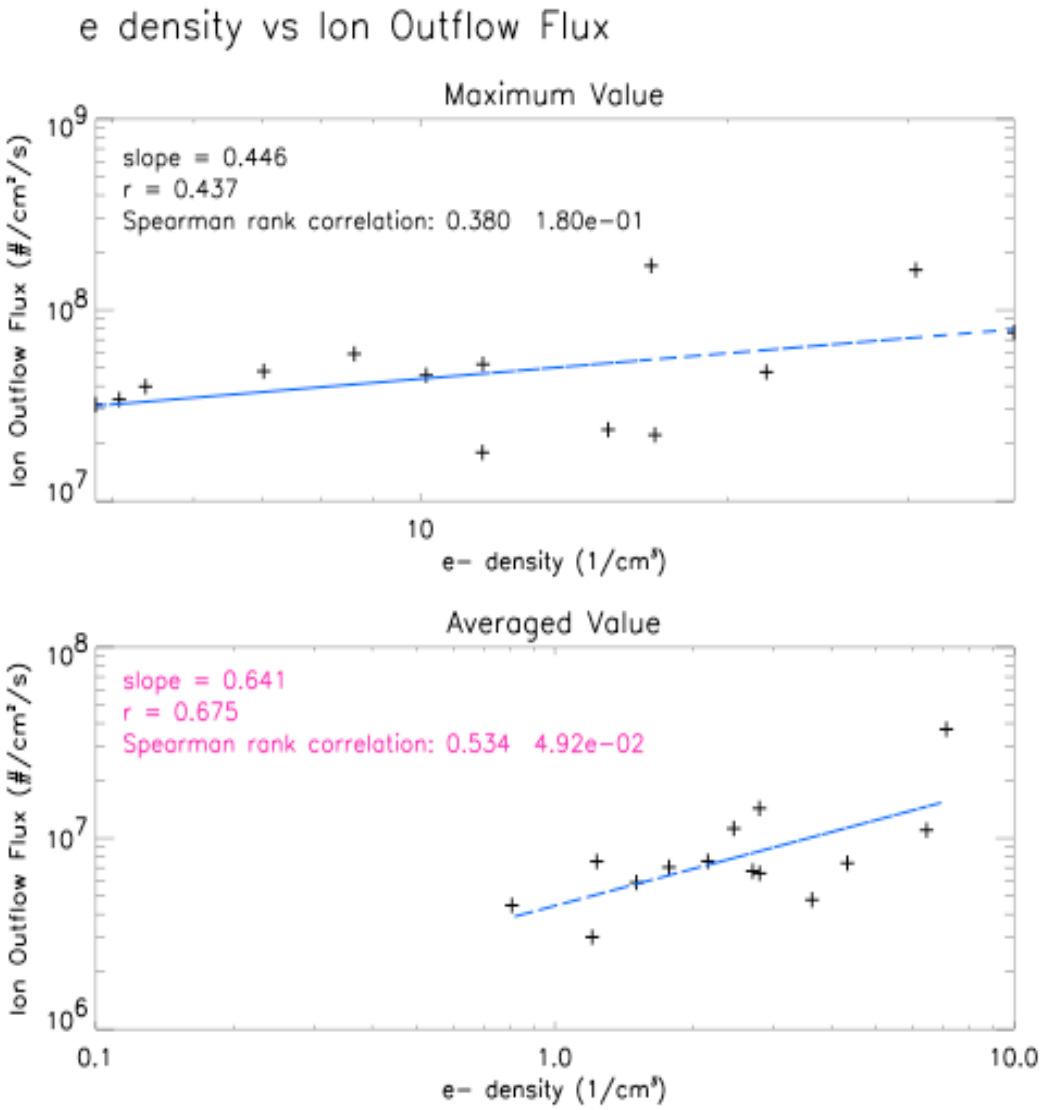
- Poynting Flux
- Good correlation
- Clearly important scaling for outflow flux of heavy ions.



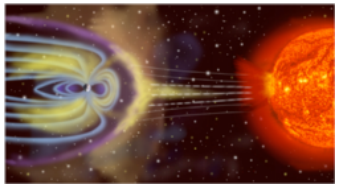
Polar study of outflow response



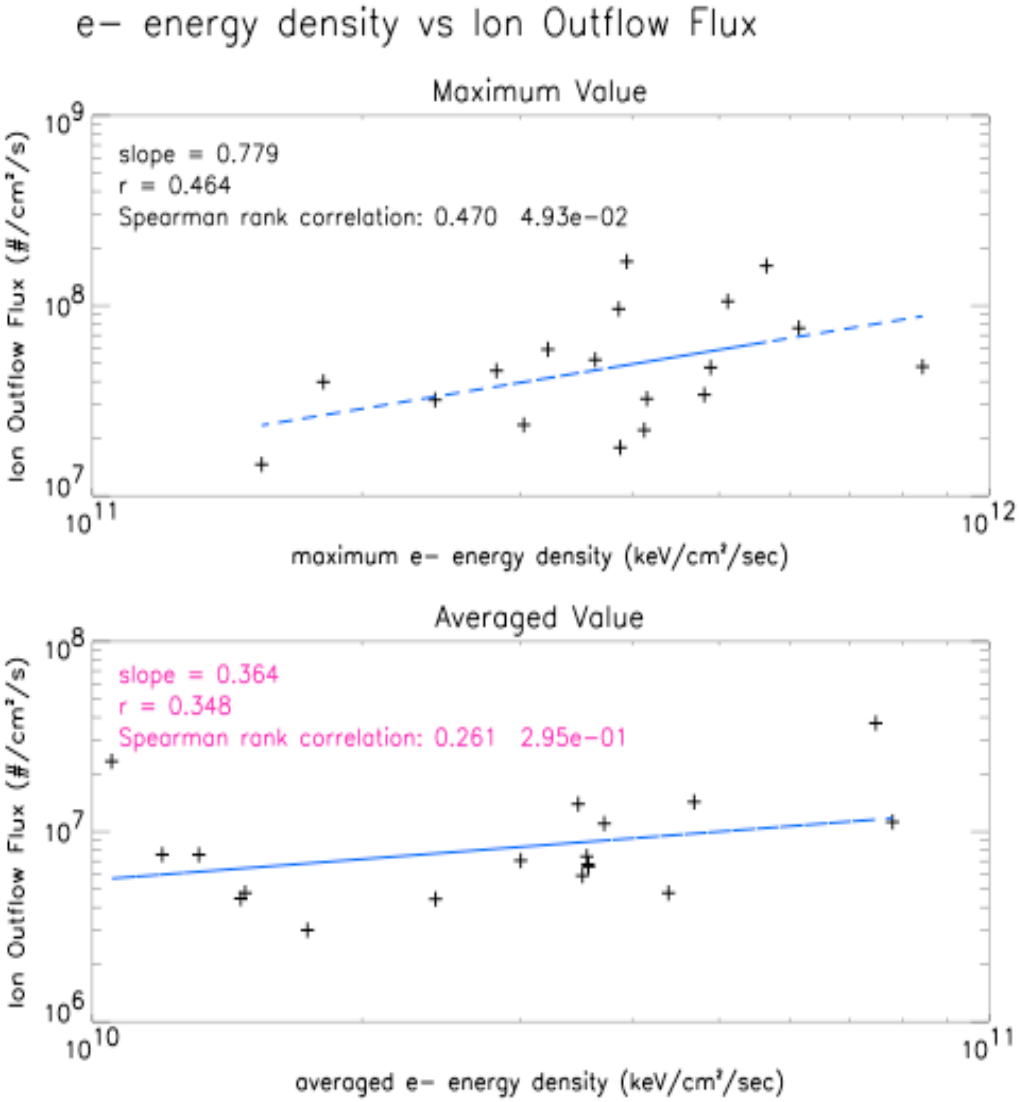
- Electron density above 15eV
- Best electron correlation param.
- Based on low resolution KP data,
- To be reworked with full resolution data.
- Correlation may improve.



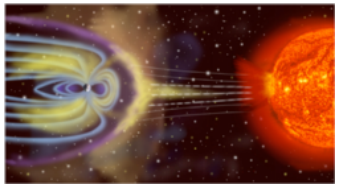
Polar study of outflow response



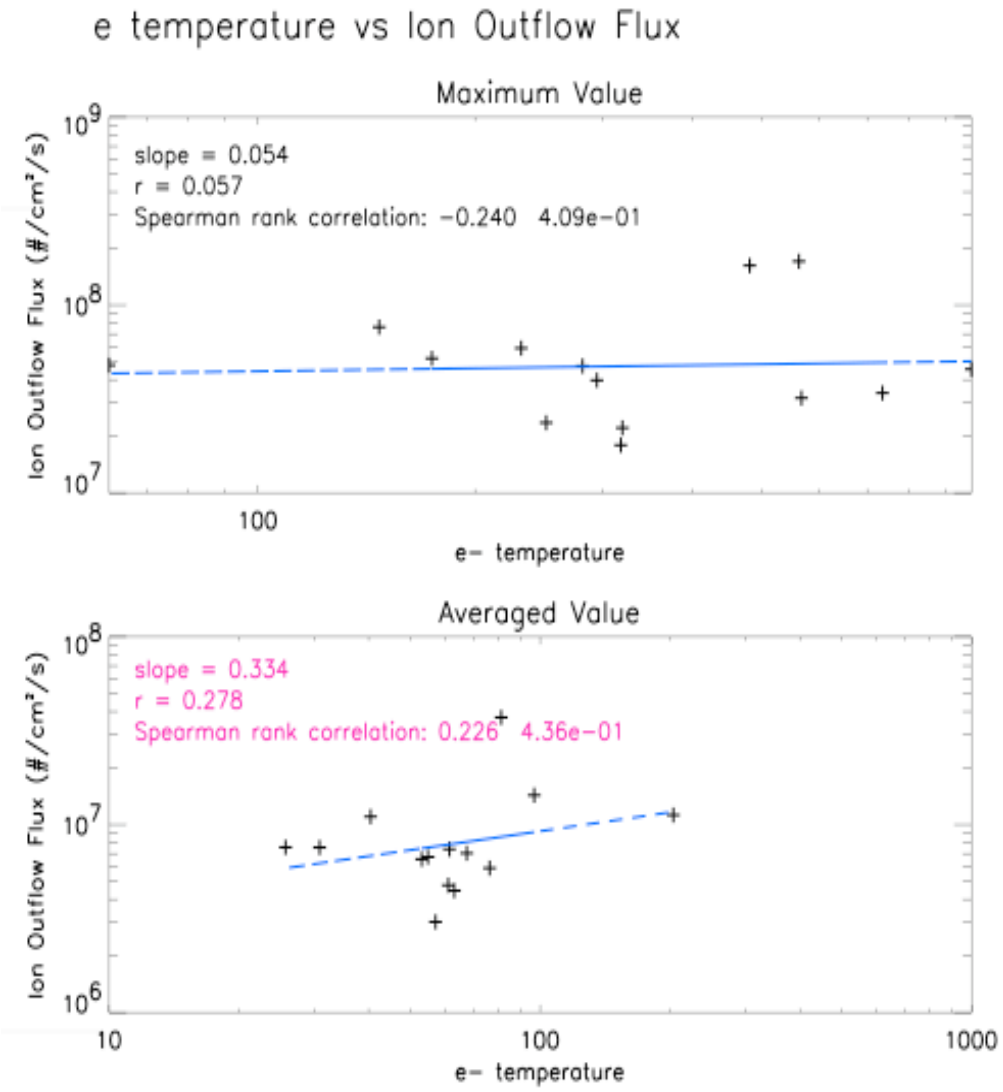
- Electron energy density or pressure
- Modest correlation with averaged value



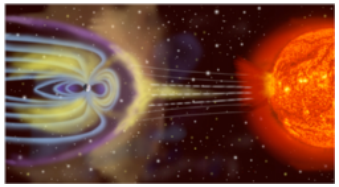
Polar study of outflow response

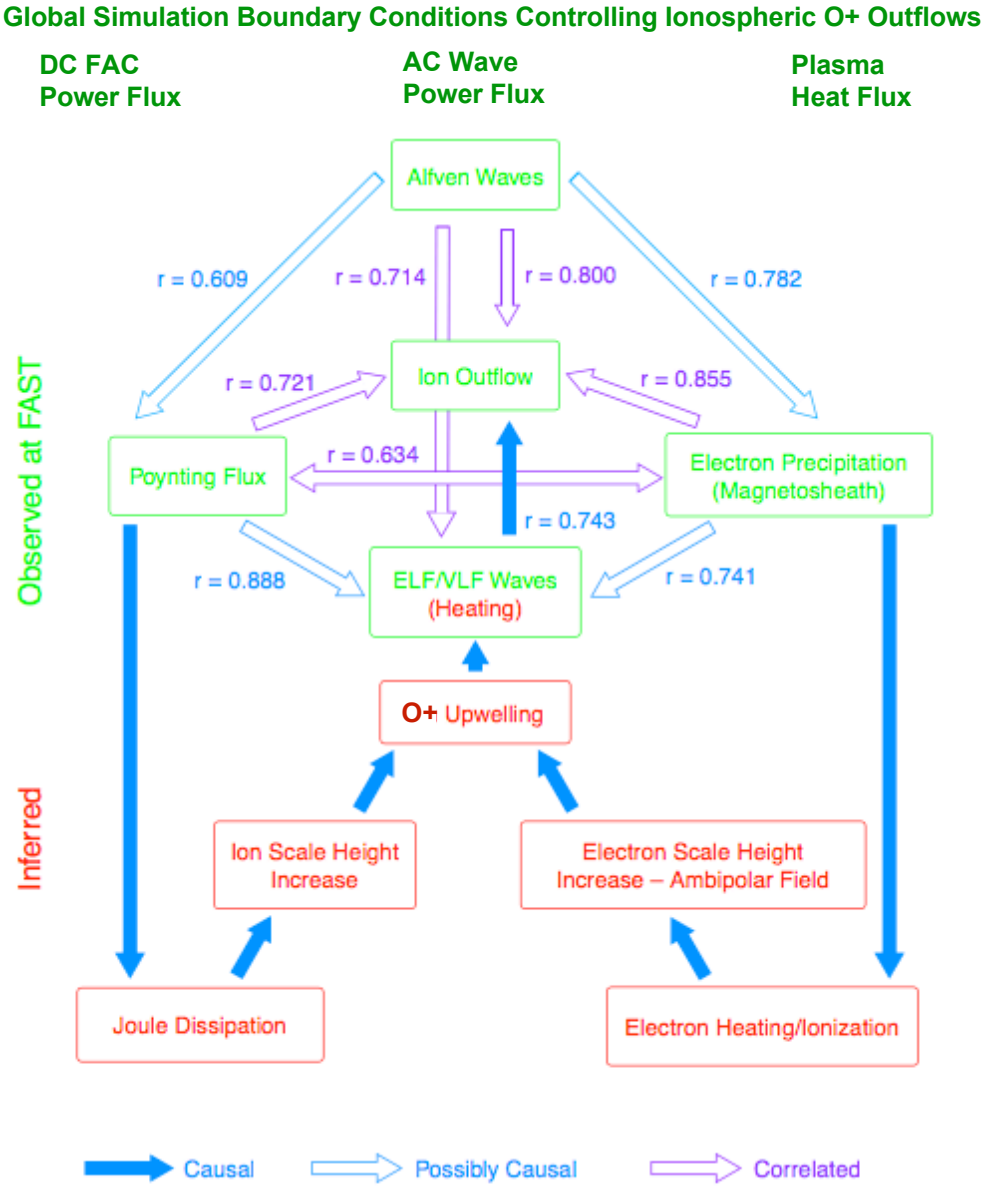


- Electron temperature
- Poor correlation



Outflow response to energy inflow





- Polar results similar to FAST results
- More events and better statistics needed
- Weak precip electron correl may improve with use of full resolution data.
- General corroboration between independent data sets suggests empirical outflow scalings are “ready for prime time” in models